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TRANSLATION STUDY AND IMMEDIATE STUDY OF GERMAN, A COMPARISON

PART I

TRANSLATION STUDY AND IMMEDIATE STUDY OF CONNECTED GERMAN

The purpose of this part of the investigation was to determine which of two methods of study is the more valuable in learning the meanings of German words.

In the translation study the pupils were directed to study with the aim of being able later to translate the passage into good English. In what is called "Immediate Study" for lack of a better name they were directed to study with the aim of being able later to give the German, if the English was given to them. The name "Immediate" is given to this method because the pupils seem to be more directly attentive to the German words and their meaning when learning by this method. Direct would be a better name perhaps but is conventionally attached to a different and much wider mode of learning and teaching. Translating *versus* memorizing the original may be used, provided it is understood that the memorizing was not for reconstruction, *per se*, but for reconstruction given the English. "German to English" learning *versus* "English to German" learning may be used provided it is understood that, in the author's opinion, it is not the mere direction of the mental bonds that is important but the degree of attention given to the German words as carriers of meaning.

The experiment was conducted in a school where two years of German are offered in the junior and senior years of the high school. The seniors were tested in the fall of 1915; the juniors in the spring of 1916. Group I will be used throughout the paper to refer to the seniors; Group II, to refer to the juniors. The results will be presented separately and compared toward the close of the study.

SECTION I

The experiment was conducted in the High School of Anaconda, Montana, an institution in co-operation with the University of Chicago. In Group I the observers were 7 senior girls and 10

senior boys who were pursuing second year German. The previous year they had completed and reviewed Spanhoff's *Elementarbuch der Deutschen Sprache*, and had translated 25 pages of Allen's *German Life*. The translation method and drill in prose composition had been used exclusively. When these tests began on November fifteenth, 1915, the class had since October seventh translated 50 pages of Bacon's *Im Vaterland*, and had pursued immediate study over six pages of the same text,—that is to say, they had studied the German with the object of being able to reproduce it, if the English translation of it were presented to them. When the tests closed on January third, they had translated 35 additional pages of *Im Vaterland*, and had pursued immediate study over 13 pages of Allen's *German Life*.

MATERIALS

The materials include pairs of selections of 160 words each and of equal difficulty in vocabulary taken from the following texts: Bacon's *Im Vaterland*, Storm's *Immensee*, Gerstaecker's *Germelshausen*, and Seidel's *Der Lindenbaum*.

METHOD OF SELECTING MATERIALS

As the object of the experiment was to determine which of two methods of study is the more economical in acquiring the meanings of German words, it seemed necessary that the pairs of selections for each method of study should be not only of equal length, but also, in so far as possible, of equal difficulty in vocabulary. The class had been translating two pages a day of *Im Vaterland*, about one and one-half pages of solid reading, the total time for which probably varied from one and one-half to two and one-quarter hours for the different members of the class. As these test selections were to be studied in class only, for 38 minutes on one day, and from 5 to 10 minutes on the following day, 160 words or about three-fourths of a page seemed a suitable length. It seemed probable that the first pair of selections should contain at least 40 words, varying numbers of which would be unfamiliar to the different members of the class. The pair was chosen as follows: I ran through selections of 160 words each checking all words which the slowest members of the class

might fail to recognize, until I found one containing 40, and one containing 41 possibly unfamiliar words. The first list of these words was placed upon the board, and the pupils were requested to write the meanings of all they knew; the gross number of unfamiliar words 367 was then made the standard for that pair. When the list of 41 was given a gross total of 409 unfamiliar words was found. As there were 17 observers a sentence of this selection containing 2 words missed by every pupil was cut out, and a sentence of the same length containing words familiar to all was substituted for it. This left a gross total of 8 too many unfamiliar words in this selection, but as this was less than one-half word per pupil the selection was used. The following pairs of selections were chosen in a similar way, but they were probably of increasing difficulty, as each pair had more unfamiliar words than the preceding.

IMMEDIATE STUDY. FIRST DAY

The selection for the day with the part of its vocabulary which was unfamiliar to the slowest pupils was placed upon the board. I gave in English the general setting of the selection, and then read the German aloud, sentence by sentence, and the pupils were called upon at random to translate it aloud; the time expended in the first translation varied from 8 minutes for the easiest selection to 16 minutes for the most difficult one. When the translation was completed 3 minutes were allowed for study of the vocabulary on the board, and then the following instructions were given: Study this German so that if I should give you the English of it you could reproduce the German, constantly try to think of the meaning rather than the English; repeat the shorter, easier sentences two or three times, the longer, more difficult ones three or four times, or until you can keep the whole thought in mind. The total time aspect was 38 minutes.

IMMEDIATE STUDY. SECOND DAY

The following day the selection was reviewed in class, for from 5 to 10 minutes; I usually read the selection aloud to the class, and any time remaining was devoted to silent immediate study.

TRANSLATION STUDY. FIRST DAY

The selection of the first paper for this method was placed upon the board; as it was taken from the text used by the class, the following instructions were given:—Translate this German into the best English you can, repeating your translation until I call time; look up any words you do not know in the vocabulary in the back of your text-book. After 30 minutes of such study, the remainder of the time, 8 minutes, was devoted to translating the German aloud; pupils were called on at random for this translation.

As selection II for this method contained 20 words not in the text used, these words were placed on the board. The pupils were directed to run through these words carefully at least twice before beginning the translation, all other unfamiliar words were to be looked up in the text. As this selection was somewhat difficult, it was translated aloud by members of the class called on at random after 15 minutes of silent study, in order that the slower pupils might not lose too much time in determining the meaning of the more difficult passages; this consumed about 12 minutes; 8 minutes were then given for silent translation study, and the last 3 minutes were used for rapid oral translation.

As Selection III was quite difficult, I read the German aloud at the beginning of the hour and helped the pupils to translate it; this with some discussion of constructions occupied 18 minutes; 3 minutes were allowed for the study of the vocabulary on the board; 13 minutes were devoted to silent translation by the pupils; 4 minutes were then given to rapid oral translation at the close of the hour.

TRANSLATION STUDY. SECOND DAY

The following day each selection was translated orally by the members of the class called upon at random. As 10 minutes were allowed the second day for study of Selection III, the first half of the time was devoted to silent translation, the second half to oral translation.

METHOD OF TESTING IMPROVEMENT

Owing to the intervening vacations it was impossible to test the successive pairs after equal intervals of time, as appears in Tables I, II, and III.

In testing to determine improvement, the list used in the preliminary test was arranged in chance order and interspersed with from 25 to 40 other difficult words, in order, in so far as possible, to prevent the recall of the context from aiding in determining the meanings of the words. The words not belonging to the preliminary test were of course not graded in the final; the difference between the number of words unfamiliar in the preliminary, and the number of the same words unfamiliar in the final represented the gain.

RESULTS

The results of the tests appear in Tables I, II, and III. If a pupil was absent for any part of the time devoted to any selection, the record for that selection, and the member of the pair corresponding to it, is omitted. The tables are presented side by side for the readers' convenience in comparing them.

DISCUSSION OF TABLES

In Table I we have the results from the study of probably comparatively easy selections of German, as appears from the small number of unfamiliar words; 10 of the 13 observers show superior records for immediate study, though the amounts of superiority vary greatly, from 1 word in several cases to 12 words in the case of observer I; 3 of 13 observers who were present for these selections show superior records for translation study, the amounts of superiority being 1, 4 and 5 words. The average superiority of immediate study is two, 23 words per pupil after an interval of 12 days.

In Table II the selections are somewhat more difficult, and the results more consistently in favor of immediate study. Observers O and I show superior records for translation study, while all the other observers show superiority in immediate study. The average superiority for the group in immediate study is 3.64 words per pupil after an interval of 8 days. The increase in the number of words acquired over those acquired in Selections A and A is, I believe, due to several factors: The pupils were not confused by the novelty of the tests; the greater number of unfamiliar words provided a greater number of easy words, and

may also have provided a greater number of words, to which previous presentations had given some degree of familiarity; directions for study were made clearer by careful explanation; the pupils were assured that their records would not influence their semester grades; immediate study was becoming familiar through short selections assigned for recitation in class; the shorter interval of 8 days between the second presentation of the material and the final test on it would also prevent a degree of forgetting as great as would be consequent upon the longer interval of 12 days for the material the records for which appear in Table I.

In Table III results are recorded for selections in which the number of unfamiliar words average about 42 per pupil. The only pupils who show superiority for translation study are C and A.

COMPARISON OF TOTAL GAINS

In the last column the total gains for each pupil by each method are recorded. In these totals D shows a superiority of 1 word for translation study, but this is due to the records in the first pair of selections and might result from misunderstanding of instructions. Observer C shows consistency in making greater gains by translation study than by immediate study in every test. She is a girl of Swedish descent who reads Swedish and both hears it spoken and speaks it a little; she thinks she acquires her vocabulary in German largely by associating the German words with their Swedish equivalents; this principle will be discussed under Section II of this paper. Observer J is a brother of observer C but his record is markedly in favor of the immediate method of study.

COMPARISON OF TABLES III AND I

For the results recorded in Table III the selections presented about 61 per cent. more unfamiliar words, than for those recorded in Table I; the time for study was increased 5 minutes; the interval before the final test was decreased from 12 to 5 days. The translation record in Table III is 113, five per cent. better than the translation record in Table I, and the record for immediate study in Table III is 121, five per cent. better than the record for immediate study in Table I. While the extra time given for study

was doubtless a factor in this difference, which, as the data discussed in Table IV will show, probably amounted to about 11.6 per cent., and while the decrease of interval before the final from 12 days to 5 days had probably a great deal to do with this difference,—considerably more perhaps than the results obtained by Magneff and Radossawljewitch on the permanence of ability to recite a section of a poem would indicate, since, as these selections in German were vivid and picturesque, the recollection of the context would be more valuable in determining the meanings of the German words, than the recall of ideas in the poems would be of assistance in recalling the exact words of the poems,—I am yet quite confident that future experiments will show that the greater part of the difference is due to the greatly increased number of easy words which would be reasonably sure to occur among twice as many unfamiliar words in an easy German context.

The advisability of the rapid introduction of new words will be discussed later in the paper.

DISCUSSION OF TABLE IV

Owing to an error in taking the time, the pair of selections, the records for which appear in Table IV, were persented 3 times in order to get equal total times. Inequalities in the amounts of time allowed in the corresponding study periods as well as failure to test the gain in the translation selection after the first 8 days interval prevent any accurate comparisons of the final results. I am including the records, however, because they seem valuable for several reasons and may offer suggestions for someone who desires to repeat and extend such experiments as these. In Selection D we have results from translation study of 44 minutes on one day, 5 minutes the following day, 10 minutes after a 14 day interval, with a succeeding 8 day interval before the final test. While teachers of German do not often review after 14 days, we probably have here in an exaggerated degree an indication of the comparative uselessness of review by translation. The 223 words gained were probably almost all learned in the first two days of study,—perhaps the greater part of them on the first day,—and as many could have been learned by immediate study in less time as the record for D' would indicate. After the English is well in mind repetition of it in successive

translations is of very little value in learning the German words, as I shall later attempt to explain. In Selection D' we have a gain of 252 words in 43 minutes of study after the first eight day interval which is equivalent to a gross total of 5.86 words per minute for the group of 16. The gross total in 59 minutes of translation study is only 3.77 words per minute. The average time per pupil spent on the first test on the immediate study material was probably about 6 minutes. After this test an interval of 7 days was given, and then the material was presented a third time for 16 minutes; if the 6 minutes test time be added to the 16 minutes study time and this be considered the total time which caused the gain from 252 words to 381 words, or 129 words, there is an average gain of 5.86 words per minute, exactly the same rate of gain as in the first 43 minute of immediate study. This one test, while not conclusive, still points to the probability that immediate study does not reach a stage where further repetition is valueless as seems to be the case with translation study. Immediate study even when carried to a high degree of overlearning would probably be very valuable in increasing the permanence of memory for the material and its vocabulary.

PART I

SECTION II

The observers when the experiment was repeated were 23 girls and 10 boys who were pursuing first year German in the Anaconda High School. When the tests began on April tenth, 1916, the class had completed and reviewed Spanhoofd's *Elementarbuch der Deutschen Sprache*, and had pursued immediate study over 50 pages of Bacon's *Vorwärts*. In the *Elementarbuch* the preliminary section of each lesson intended for use by the direct method had first been taken up orally in class, and the pupils had then been directed to study so as to be able to give the German when I gave them the English; translations and variations of this material were given by me in English the next day and the pupils either wrote the German translation, or were called upon, at random, to give the translation aloud. All the inflections and the vocabularies of the first half of the book had been assigned to be committed. About half of the prose work had been required as

outside preparation; some of it had been done in class time. Most of the short stories were assigned for immediate study, and then used as a basis for "free reproduction." Then the pupils assumed the part of some character in the story and wrote as much of it in German as they could recall.

MATERIALS

The materials included the selections from Storm's *Immensee* and Gerstäcker's *Germelhausen* presented previously to the seniors. The type of study was, however, reversed for these students, the translation selections for group I becoming immediate study selection for group II, and vice versa.

PRELIMINARY TESTS

The preliminary tests of group I were repeated, and slight changes made to render them of equal difficulty for group II, as the vocabularies acquired by the two groups previous to the tests were slightly different.

IMMEDIATE STUDY. FIRST DAY

The procedure with this group differed from that followed with Group I, in that these pupils were required to get the meaning of the selection each for himself through silent, independent study; 14 minutes were allowed for this; from 6 to 8 minutes were then spent on translation aloud by members of the class called on at random; from 4 to 6 minutes were spent in studying the vocabulary i.e. the preliminary test; the remainder of the time, about 10 to 14 minutes, was devoted to immediate study.

IMMEDIATE STUDY. SECOND DAY

In the second presentation 5 minutes were devoted to the study of the vocabulary, and 5 to immediate study.

TRANSLATION STUDY

With this group more time was devoted to the study of the vocabulary in order to approach more nearly the procedure of those teachers who use the translation method, but who also

require that some time be devoted to memorizing new words. The pupils were first directed to prepare the selection so as to translate it aloud into good English. I intended to give 14 minutes for this, as I had done in the immediate study selection, but the majority requested the privilege of going over the selection twice before being asked to translate aloud, and this was granted. At the end of 25 minutes they were ready and the selection was translated aloud sentence by sentence by members of the class called on at random; this required from 6 to 8 minutes; in the first selection the remainder of the time was devoted to silent study of the vocabulary and constructions; in the second selection to a study and discussion of constructions. The second day 6 minutes were devoted to a study of the vocabulary, and 4 minutes to translation.

TABLE IX

In Table IX some of the facts of Tables VIII and V have been placed side by side for further study. The implications would be clearer if a preliminary test had been given in English as well as in German. The preliminaries for these selections contained 45 words; that is to say, in these selections of 160 words each, 115 words in each selection were perfectly familiar to the students. Of the 45 given in the preliminaries in German, the number unfamiliar to each pupil is recorded in the first column under each Selection. If the 45 be multiplied by 29, the number of the group present for the tests, we have a gross total of 1305; 1052 of the words of Selection S¹ were unfamiliar, or stating it in terms of the words familiar, we have 253; 1044 of the words of Selection S were unfamiliar, leaving a gross total of 261 familiar. In other tests not recorded here I found that when a test in English was given on the same words as were the following day tested in German, the group would know about 25 per cent. as many of the German equivalents for the English as they knew of the English equivalents for the German. This *statement applies only to tests on relatively unfamiliar words, such as were used here*: that they were relatively unfamiliar can be seen from the fact that in Selection S¹, the best student, observer 2, knew only 16 words in the test in German, while the poorest students, observers 27 and 33, knew only 2 words. The relative numbers of

familiar words in Selection S are about the same. If we assume then that the number of words known as English-German associations before the study began was 25 per cent. of those known in the German test, we have 64 words already familiar. The gain then in the English test would be 475 minus 64, or 411 words for Selection S¹ by translation study, and 761 minus 64, or 697 words for Selection S by immediate study. The gain in German words remembered after an interval of 12 days was for Selection S¹ 432, for Selection S 582.

Immediate study is then superior to translation study for acquiring both English-German and German-English associations; for the intervals used here, however, the relative superiority is greater for English-German associations. If we express the superiority in per cent., we have for the English-German association 68+; for the German-English, 35—; if we express the superiority in words per pupil, we have for the English-German 9.86; for the German-English 5.17. The reader must bear in mind, however, that to get a German-English association so well that it will long persist does not insure the memory of the word as an English-German association; on the other hand to get certain words in a list sufficiently well to recall the German when the English is presented does not mean that all of those words can be recalled when a test in German is later given, and conversely not to get certain ones in the list sufficiently well to recall the German for the English does not mean that all those words can not be recalled when a test in German is later given; that is to say, the relative strengths of English-German associations are by no means perfectly correlated with the relative strengths of the equivalent German-English associations. I believe the correlation is considerably higher in immediate study than in translation study, but I have no data checked up to prove such a statement at this time.

In the following paragraph I have given what seems to me some of the main differences in the psychological processes involved in the two types of study.

PSYCHOLOGICAL DISCUSSION

One reason for the superior records obtained by immediate study is very probably the fact that instruction to learn the

German so as to be able to recall it, if the English is presented, arouses greater effort; the pupils realize the greater difficulty of the task, but as they also realize that it is a task within their capacity, they work with more determination and more strenuous and persistent effort, than they would do on the easier task of translation.

Another reason and perhaps a more potent one is probably the direction of attention necessitated or at least favored by the different ends in view in the two methods.

In a first translation the great majority of the new words must be looked up by the student, and accordingly all except those few for which the context immediately supplies the meaning get some degree of attention; as the context becomes familiar, however, it becomes at the same time a series of continuous phrases each with its nucleus or meaning-core on which the attention halts, but the remainder of the phrase, for which the nucleus word is an adequate stimulus, gets practically no attention; during several translations, the pattern of phrases with their respective nuclei probably remains about the same, and this would probably be true during almost the full time allowed for all these selections, except those the results for which are recorded in Table IV; with a greater number of repetitions the phrases would probably amalgamate into larger groups, and some of the former nuclei would become subordinate to others, and these would accordingly become stimuli for longer phrases; this hierarchy of units would gradually reorganize into still longer units, and would finally, if the repeated translations were long enough continued, reduce to very few units. Furthermore, the nuclei in the earlier stages of translation would probably be the easier German words, which by their similarity to English, or some other peculiar capacity to attach associations to themselves, would most readily serve as continuous stimuli; if at any time the context seemed quite forgotten, and no easy word occurred among several words, these harder words would have to be looked up in order, until memory of the context or familiar stimuli set one straight in translation again; in this way the more difficult words might at times receive enough attention to be remembered. In such study, then, we have for the length of time given in these selections a series of repetitions in which attention to the various

German words is only that demanded for the English translation; more than this, the German words which are getting attention are not getting attention as to spelling and detail; translation demands attention only to certain outstanding features of the word, and the average student is probably no more interested in its very peculiarity than is the reader of English in reading English words letter by letter; in fact, the association in German is probably considerably weaker, because inner speech is being connected not with the German but the English equivalent. The process of translation seems then to narrow its possibilities for the learner in two ways; first by making almost no attention necessary for parts of phrases, and second by attaching English associations to predominant features of words which are by no means adequate for the English-German associations.

In immediate study, on the other hand, as the pupil is attempting to absorb every word for reproduction in German, every word is pronounced in German, and gets its due measure of attention to spelling and detail; as the process of reading in German continues the easier words will be read more hastily, and the more difficult ones will become the nuclei of attention and get slower pronunciation and more careful analysis and inspection; there is here as in translation study a reorganization and new distribution of attention, but the reorganization serves to direct attention to the mastery of the difficult words; in this process, moreover, the withdrawal of attention from easy words is not so complete as is the withdrawal of attention from words known by the context in translation study, nor is there ever any premium placed on the directing of attention to certain predominant features of words rather than to the words with their details. The method of study is therefore economical even when long-continued on the same material; the easier words are being rendered permanent for a longer period of time, and the more difficult words which can not be brought up to the threshold of recall after some interval of time have nevertheless been frequently and carefully repeated, and have accordingly acquired rather strong bonds in the nervous system, so that they will be learned anew with fewer repetitions.

The actual superiority of immediate study over translation study is therefore very difficult to determine. It seems rather certain that translation study by its inherent demand for English

equivalents only is from this very fact rendered of no great value after the meaning is once mastered except perhaps to render somewhat permanent a rather limited number of German-English associations. Immediate study, on the other hand, seems valuable not only to the extent indicated in the gross results of the majority of the tables, but also as Tables IV and VIII seem to indicate, in forming rather strong bonds with the more difficult words which are however too weak for recall after several days interval, and are therefore not apparent in the scores.

FAYE BENNETT.

GROUP I

Observers	TABLE I		TABLE II		TABLE III		Total immediate superiority in words
	Selection R	Selection R ¹	Selection S	Selection S ¹	Selection T	Selection T ¹	
	Trans.	Immediate	Trans.	Immediate	38 Min.	38 Min.	
	38 Min. 5 Min.	38 Min. 5 Min.	38 Min. 5 Min.	38 Min. 5 Min.	38 Min. 10 Min.	38 Min. 10 Min.	
in Preliminary Gain 12 day interval	in Preliminary Gain 12 day interval	in Preliminary Gain 12 day interval	in Preliminary Gain 8 day interval	in Preliminary Gain 8 day interval	in Preliminary Gain 5 day interval	in Preliminary Gain 5 day interval	
A	27 10	28 11	30 10	32 17	45 26	44 21	3
B	A A	A A	A A	A A	51 22	46 24	2
C	27 14	23 10	33 13	29 12	44 30	40 24	—11
D	31 10	28 5	36 4	33 7	44 17	46 18	—1
E	26 9	27 15	35 12	35 17	45 29	41 38	20
F	A A	A A	29 17	31 21	37 23	38 34	15
G	35 13	30 11	39 7	39 12	A A	A A	3
H	A A	A A	A A	A A	37 25	40 29	4
I	28 8	29 20	34 11	35 23	43 22	44 30	32
J	21 11	23 19	30 8	31 17	35 22	37 27	22
K	A A	A A	A A	A A	44 16	44 26	10
L	26 10	28 13	37 17	37 21	45 20	46 28	15
M	21 5	24 7	32 9	31 10	47 20	40 21	4
N	31 13	30 14	36 10	36 11	43 16	42 25	11
O	29 4	27 5	38 7	35 9	49 11	48 20	12
P	15 11	18 14	24 15	24 18	31 26	32 32	12
Q	20 10	18 13	33 19	28 15	31 19	38 31	11
	337 128	333 157	463 159	455 210	671 344	666 428	164
Words per pupil, trans.	=9.85		Words per pupil, trans. =11.36		Words per pupil, trans. =21.5		
Words per pupil, im-	mediate =12.08		Words per pupil, im-		mediate =26.75		
Superiority, immediate	=2.23		Superiority, immediate =3.64		Superiority, immediate =5.25		

The average superiority of immediate study = 26 per cent. As the last words added were more difficult than those added earlier, this per cent. is probably considerably too low to represent the actual difference in achievement. This principle will be discussed later in the paper.

GROUP I

TABLE IV

Observers	Selection X		Selection X ¹		Interval	
	Trans. 44 Min. 5 Min. Interval 14 days 10 Min. in in unfamiliar words Preliminary Gain after further interval		Immediate 38 Min. 5 Min. in in unfamiliar words Preliminary Gain 8 da. interval		7 days 16 Min. da. Interval Gain after further Interval	
A	35	15	36	16	25	
B	43	12	42	19	28	
C	33	17	37	17	25	
D	37	11	38	10	26	
E	39	14	37	21	29	
F	28	14	24	15	20	
G	41	16	38	10	21	
H	A	A	A	A	A	
I	39	15	38	17	24	
J	30	13	30	16	25	
K	36	17	40	14	24	
L	36	11	40	20	24	
M	36	12	34	12	16	
N	38	11	40	11	20	
O	41	11	40	16	20	
P	24	22	24	18	24	
Q	31	12	32	20	30	
Total	567	223	570	252	381	

Words per pupil, 59 min. translation study = 13.94

" " " 43 min. immediate study = 15.75

" " " 59 min. immediate study plus 6 min. for first test = 23.81

" " minute, 59 min. translation study = 3.78

" " minute, 43 min. immediate study = 5.86

" " minute in next 16 min. immediate study plus 6 min. for first test = 5.86

GROUP II

TABLE V

Selection S¹
Trans.
38 Min.
10 Min.

Selection S
Immediate
38 Min.
10 Min.

Unfamiliar in Preliminary
Gain 9 day interval

Unfamiliar in Preliminary
Gain 9 day interval

TABLE VI

Selection X¹
Trans.
35 Min.
10 Min.

Selection X
Immediate
35 Min.
10 Min.

Unfamiliar in Preliminary
Gain 12 day interval

Unfamiliar in Preliminary
Gain 12 day interval

Total immediate superiority

Observers	Unfamiliar in Preliminary Gain 9 day interval	Unfamiliar in Preliminary Gain 9 day interval	Unfamiliar in Preliminary Gain 12 day interval	Unfamiliar in Preliminary Gain 12 day interval	Total immediate superiority
1	31 29	31 24	35 21	36 33	7
2	24 18	27 23	29 22	27 23	6
3	28 16	28 25	30 14	33 21	16
4	31 15	30 16	35 17	34 19	3
5	27 16	29 17	34 16	25 15	0
6	30 14	33 27	35 31	36 33	15
7	A A	A A	33 10	35 13	3
8	28 13	32 26	35 21	31 21	13
9	31 16	33 24	34 15	32 21	14
10	31 10	32 23	37 18	37 25	19
11	33 17	32 17	34 22	38 25	3
12	A A	A A	A A	A A	A
13	36 10	32 15	37 14	39 24	15
14	34 11	35 17	38 8	35 13	11
15	31 12	34 18	29 7	36 9	8
16	32 10	34 11	38 18	38 23	7
17	A A	A A	36 19	38 22	3
18	35 11	34 19	36 13	37 19	14
19	35 11	33 14	34 10	36 25	18
20	39 14	39 21	39 11	41 15	11
21	31 7	35 14	36 12	36 23	18
22	34 14	35 18	35 14	34 13	3
23	36 12	39 29	40 19	36 23	21
24	36 18	33 11	36 12	39 20	1
25	35 9	38 15	38 14	37 12	4
26	38 10	35 10	39 6	40 17	11
27	39 10	39 10	42 13	41 15	2
28	37 8	37 9	39 11	37 17	7
29	A A	A A	A A	A A	A
30	38 6	39 11	39 7	40 9	7
31	38 7	39 6	A A	A A	-1
32	37 5	38 9	37 4	38 20	20
33	38 16	37 18	42 19	38 24	7
Total	973 365	992 497	1081 438	1080 592	286

Words per pupil, trans. = 12.6
 " " " immediate = 17.1
 Superiority, immediate = 4.5

Words per pupil, trans. = 14.6
 " " " immediate = 19.7
 Superiority, immediate = 5.1

TABLE VII

	Selections	Study Time in Minutes	Intervals in Days	Ave. Number Unfamiliar Words	Ave. Gain in Per cent. Translation Study	Ave. Gain in Per cent. Immediate Study
Group I	R-R ¹	43	12	26	35	47
Group I	S-S ¹	43	8	33	34	46
Group I	T-T ¹	43	5	42	51†	64†
Group II	S-S	48	9	34	37	50
Group II	X-X ¹	48*	12	36	41	55

*An English-German test after an interval of one day probably accounts for some of the increased per cent. in Selections X and X¹.

†The shorter interval of five days probably accounts for some of the increased per cent. of gain in Selections T and T¹.

TABLE IX

GROUP II

Observers	Selection S ¹ Translation			Selection S Immediate		
	Unfamiliar Words in Preliminary in German	Words Remembered in English Test, 1 day Interval	Words Gained in German Test, 12 days Interval	Unfamiliar Words in Preliminary in German	Words Remembered in English Test, 1 day Interval	Words Gained in German Test, 12 days Interval
1	35	23	21	36	40	33
2	29	31	22	27	38	23
3	30	18	14	33	35	21
4	35	17	17	34	25	19
5	34	20	16	25	37	15
6	35	30	31	36	39	33
7	33	13	10	35	24	13
8	35	24	21	31	32	21
9	34	19	15	32	32	21
10	37	16	18	37	27	25
11	34	25	22	38	31	24
12	A	A	A	A	A	A
13	37	15	14	39	24	24
14	38	16	8	35	28	13
15	A	A	A	A	A	A
16	38	15	18	38	30	23
17	36	17	19	38	19	22
18	36	17	13	37	25	19
19	34	16	10	36	28	25
20	39	10	11	41	15	15
21	36	23	12	36	27	23
22	35	19	14	34	27	13
23	40	17	19	36	31	23
24	36	9	12	39	25	20
25	38	8	14	37	22	12
26	39	6	6	40	17	17
27	42	10	13	41	11	15
28	39	15	12	37	20	17
29	A	A	A	A	A	A
30	39	7	7	40	9	9
31	A	A	A	A	A	A
32	37	6	4	38	18	20
33	42	13	19	38	25	24
	1052	475	432	1044	761	582
	Probable gain = 419			Probable gain = 705		